CLAIMS

1. A light-emitting element comprising:

a pair of electrodes;

a first layer containing a light-emitting material;

a second layer containing an n-type semiconductor; and

a third layer containing a p-type semiconductor,

wherein the first layer, the second layer, and the third layer are interposed between the pair of electrodes and sequentially formed in such a way that the third layer is formed to be in contact with one of the pair of electrodes.

2. A light-emitting element according to Claim 1, wherein the n-type semiconductor is a metal oxide.

3. A light-emitting element according to Claim 1, wherein the n-type semiconductor comprises at least one compound selected from the group consisting of zinc oxide, tin oxide, and titanium oxide.

4. A light-emitting element according to Claim 1, wherein the p-type semiconductor is a metal oxide.

5. A light-emitting element according to Claim 1, wherein the p-type semiconductor comprises at least one compound selected from the group consisting of vanadium oxide, chromium oxide, molybdenum oxide, cobalt oxide, and nickel oxide.

6. A light-emitting element according to Claim 1, wherein an electrode of the pair of electrodes being in contact with the third layer is made from a conductive material formed by sputtering.

7. A light-emitting element according to Claim 6, wherein the conductive

material is transparent to visible light.

8. A light-emitting element according to Claim 1, wherein a part of the first layer comprises molybdenum oxide.

9. A light-emitting element comprising:

a pair of electrodes;

a first layer containing a light-emitting material;

a second layer containing an organic compound and a material having an electron donor property for the organic compound; and

a third layer containing p-type semiconductor,

wherein the first layer, the second layer, and the third layer are interposed between the pair of electrodes and sequentially formed in such a way that the third layer is formed to be in contact with one of the pair of electrodes.

10. A light-emitting element according to Claim 9, wherein the p-type semiconductor is a metal oxide.

11. A light-emitting element according to Claim 9, wherein the p-type semiconductor comprises at least one compound selected from the group consisting of vanadium oxide, chromium oxide, molybdenum oxide, cobalt oxide, and nickel oxide.

12. A light-emitting element according to Claim 9, wherein the organic compound is an organic compound having an electron transporting property.

13. A light-emitting element according to Claim 9, wherein the organic compound is a metal complex having a ligand with a π-conjugated skeleton.

14. A light-emitting element according to Claim 9, wherein a material having an electron donor property is an alkali metal, an alkaline earth metal, or a rare earth

metal.

15. A light-emitting element according to Claim 9, wherein an electrode of the pair of electrodes being in contact with the third layer is made from a conductive material formed by sputtering.

16. A light-emitting element according to Claim 15, wherein the conductive material is transparent to visible light.

17. A light-emitting element according to Claim 9, wherein a part of the first layer comprises molybdenum oxide.

18. A light-emitting element comprising:

a pair of electrodes;

a first layer containing a light-emitting material;

a second layer containing n-type semiconductor; and

a third layer containing an organic compound and a material having an electron acceptor property for the organic compound,

wherein the first layer, the second layer, and the third layer are interposed between the pair of electrodes and sequentially formed in such a way that the third layer is formed to be in contact with one of the pair of electrodes.

19. A light-emitting element according to Claim 18, wherein the n-type semiconductor is a metal oxide.

20. A light-emitting element according to Claim 18, wherein the n-type semiconductor comprises at least one compound selected from the group consisting of zinc oxide, tin oxide, and titanium oxide.

21. A light-emitting element according to Claim 18, wherein the organic

compound is an organic compound having a hole transporting property.

22. A light-emitting element according to Claim 18, wherein the organic compound is an organic compound having an aromatic amine skeleton.

23. A light-emitting element according to Claim 18, wherein the material having an electron acceptor property is a metal oxide.

24. A light-emitting element according to Claim 18, wherein an electrode of the pair of electrodes being in contact with the third layer is made from a conductive material formed by sputtering.

25. A light-emitting element according to Claim 24, wherein the conductive material is transparent to visible light.

26. A light-emitting element according to Claim 18, wherein a part of the first layer comprises molybdenum oxide.

27. A light-emitting element comprising:

a pair of electrodes; and

a first layer containing a light-emitting material;

a second layer containing a first organic compound and a material having an electron donor property for the first organic compound; and

a third layer containing a second organic compound and a material having an electron acceptor property for the second organic compound,

wherein the first layer, the second layer, and the third layer are interposed between the pair of electrodes and sequentially formed in such a way that the third layer is formed to be in contact with one of the pair of electrodes.

28. A light-emitting element according to Claim 27, wherein the first organic

compound is an organic compound having an electron transporting property.

29. A light-emitting element according to Claim 27, wherein the first organic compound is a metal complex having a ligand with a π-conjugated skeleton.

30. A light-emitting element according to Claim 27, wherein a material having an electron donor property is an alkali metal, an alkaline earth metal, or a rare earth metal.

31. A light-emitting element according to Claim 27, wherein the second organic compound is an organic compound having a hole transporting property.

32. A light-emitting element according to Claim 27, wherein the second organic compound is an organic compound having an aromatic amine skeleton.

33. A light-emitting element according to Claim 27, wherein the material having an electron acceptor property is a metal oxide.

34. A light-emitting element according to Claim 27, wherein an electrode of the pair of electrodes being in contact with the third layer is made from a conductive material formed by sputtering.

35. A light-emitting element according to Claim 34, wherein the conductive material is transparent to visible light.

36. A light-emitting element according to Claim 27, wherein a part of the first layer comprises molybdenum oxide.

37. A light-emitting element comprising:

a pair of electrodes; and

a first layer containing a light-emitting material;

a second layer containing an organic compound and a metal; and

a third layer made from a metal oxide,

wherein the first layer, the second layer, and the third layer are interposed between the pair of electrodes and sequentially formed in such a way that the third layer is formed to be in contact with one of the pair of electrodes.

38. A light-emitting element according to Claim 37, wherein the organic compound is an organic compound having an electron transporting property.

39. A light-emitting element according to Claim 37, wherein the organic compound is a metal complex having a ligand with a π-conjugated skeleton.

40. A light-emitting element according to Claim 37, wherein the second organic compound is an organic compound having a hole transporting property.

41. A light-emitting element according to Claim 37, wherein the second organic compound is an organic compound having an aromatic amine skeleton.

42. A light-emitting element according to Claim 37, wherein the metal is an alkali metal, an alkaline earth metal, or a rare earth metal.

43. A light-emitting element according to Claim 37, wherein the metal oxide comprises at least one compound selected from the group consisting of vanadium oxide, chromium oxide, molybdenum oxide, cobalt oxide, and nickel oxide.

44. A light-emitting element according to Claim 37, wherein an electrode of the pair of electrodes being in contact with the third layer is made from a conductive material formed by sputtering.

45. A light-emitting element according to Claim 44, wherein the conductive material is transparent to visible light.

46. A light-emitting element according to Claim 37, wherein a part of the first layer comprises molybdenum oxide.

47. A light-emitting element comprising:

a pair of electrodes; and

a first layer containing a light-emitting material;

a second layer containing a first organic compound and metal; and

a third layer containing a second organic compound and a metal oxide,

wherein the first layer, the second layer, and the third layer are interposed between the pair of electrodes and sequentially formed in such a way that the third layer is formed to be in contact with one of the pair of electrodes.

48. A light-emitting element according to Claim 47, wherein the first organic compound is an organic compound having an electron transporting property.

49. A light-emitting element according to Claim 47, wherein the first organic compound is a metal complex having a ligand with a π-conjugated skeleton.

50. A light-emitting element according to Claim 47, wherein the second organic compound is an organic compound having a hole transporting property.

51. A light-emitting element according to Claim 47, wherein the second organic compound is an organic compound having an aromatic amine skeleton.

52. A light-emitting element according to Claim 47, wherein the metal is an alkali metal, an alkaline earth metal, or a rare earth metal.

53. A light-emitting element according to Claim 47, wherein the metal oxide comprises at least one compound selected from the group consisting of vanadium oxide, chromium oxide, molybdenum oxide, cobalt oxide, and nickel oxide.

54. A light-emitting element according to Claim 47, wherein an electrode of the pair of electrodes being in contact with the third layer is made from a conductive material formed by sputtering.

55. A light-emitting element according to Claim 54, wherein the conductive material is transparent to visible light.

56. A light-emitting element according to Claim 47, wherein a part of the first layer comprises molybdenum oxide.